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IS 1448-51 (1963): Methods of test for petroleum and its products, Part 51: Copper strip corrosion test for lubricating greases [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]

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“Knowledge is such a treasure which cannot be stolen”

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IS : 1448 [P : 51] - 1963
Adopted : 21 December 1963

(Reaffirmed 2003)

Indian Standard

METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

[P : 51]

COPPER STRIP CORROSION TEST FOR LUBRICATING GREASES

(Third Reprint MAY 1996)

UDC 621·892 : 620·193 [669·3-418·2]

Adapted, with permission, from the Institute of Petroleum Standard No. IP 112/56

[The method given in P: 51 will supersede the method in L: 20 of IS : 310 (Part II)-1954*]

1. SCOPE

1.1 This method is intended for the detection of corrosive substances in lubricating greases.

2. OUTLINE OF THE METHOD

2.1 A cleaned and smoothly polished copper strip is immersed in the sample to be tested, which is then maintained at the specified temperature for the specified length of time. The strip is removed from the sample, washed with the specified petroleum hydrocarbon solvent and ethyl ether, and examined for evidence of etching, pitting or discolouration.

2.1.1 As lubricating greases are employed under a diversity of conditions, it is not possible here to specify either the temperature or the duration of the test, but it is recommended that the temperature should be not higher than 20 deg C below the drop point of the sample.

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*Methods of sampling and test for lubricants, Part II.

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2.1.2 In conformity with prevailing practice, copper has been prescribed as the test metal, but other metals may be used and in a form other than rolled strip, if desired.

3. APPARATUS

3.1 Beaker — Tall form, made of glass and of 100 ml capacity.

3.2 Copper Strip — Cold-rolled strip not less than 0·5 mm thick, cut into pieces 75 mm long and 13 mm wide. Use one piece for each test.

3.2.1 The three grades of copper in common use, that is, tough-pitch high-conductivity copper, phosphorus deoxidized copper, and oxygen-free high-conductivity copper, have been found to give comparable results.

3.3 Oven — controlled within ± 2 deg C of the specified test temperature.

4. REAGENTS

4.1 Ether — (*see* IS : 336-1964*).

4.2 Petroleum Hydrocarbon Solvent (60/80) — boiling between 60° and 80°C and aromatic-free.

4.3 Carborundum Powder — No. 150 grade.

5. PREPARATION OF THE COPPER STRIP

5.1 Polish the copper strip mechanically on the two faces to obtain a uniform finish free from defects. Clean and polish the strip with a pad of cotton wool and carborundum powder (No. 150) and then with successive pads of cotton wool until a fresh pad remains unsoiled after use. Wash the strip with ether and allow it to dry. Use clean forceps for all further handling of the strip.

6. PROCEDURE

6.1 Fill the beaker with the sample to within 6 mm of the top and, with the aid of a spatula, level and smooth the surface. Coat a freshly prepared copper strip with a thin film of the material up to 48 mm from one end and insert that end vertically to a depth of 50 mm into the material contained in the beaker. Press the surface of the material into contact with the strip and level it again with the spatula. Place the beaker and its contents in an oven controlled to within ± 2 deg C of the specified temperature for the specified period. At the end of this period remove the beaker from the

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*Specification for ether (*revised*).

oven and allow it to cool to room temperature. Withdraw the copper strip, wipe it with cotton wool, and wash it, first with the petroleum hydrocarbon solvent and then with ether. Examine the surface condition of the copper strip for etching, pitting or discolouration.

7. REPORT

7.1 Report if colour or scale is removed from the strip by the cleaning treatment and describe the state of the copper strip, using one of the following terms:

a) Etching
b) Pitting
c) Discolouration:
  1) black
  2) grey
  3) not black or grey

Otherwise report the test as negative.

7.1.1 Thin transparent corrosion films on the copper strip may produce a series of interference colours. As the corrosion film becomes thicker the series of colours may be repeated, and it follows that a particular colour cannot be related to the thickness of the film unless it can be established that it is one of the first-order sequence. For this reason it is recommended that colours other than black or grey be not individually recorded.

8. PRECISION

8.1 The precision of this method has not been established.

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